SCHEDULE FOR FIELD DESCRIPTION OF SEDIMENTARY ROCKS

Note: - Define all terms that might be at all uncertain. Use metric units if possible. Describe first the largest units recognized, then those of the next order, and so on down to the smallest.

A. External form of the rock unit. Lenticular, persistent, very regular in thickness, etc.; dimensions.

B. Color. Color of unit as a whole, wet or dry, according to Ridgway or Munsell color systems, or color card of this committee.

C. Bedding.

1. How manifested: Sharp, by partings, by difference in texture, color, etc.; transitional; shaly (see introductory note).

2. Shape of bedding surfaces: Plane, undulating, ripple-marked, etc.; irregular; if not plane, give details of form and dimensions of features.

3. Thickness of beds: Comparative thicknesses; different orders. Relation of thicknesses; rhythmic; random. If variable, relation between thickness and composition, bedding, etc.

4. Attitude and direction of bedding surfaces: Horizontal, inclined, curved. Relation to each other: Parallel, intersecting, tangential; angles between different attitudes and directions; dip, strikes; dimensions; relation of size, composition, shape, etc., to attitude and direction; relation of composition to different types of bedding.

5. Markings of bedding surfaces: Mud cracks, rain prints, bubble impressions, ice-crystals impressions, trails, footprints, etc.

6. Disturbances of bedding: Edgewise or intraformational conglomerates, folding or curmpling of individual beds before consolidation, etc.

D. Composition.

1. Inorganic constituents.

a. Mineralogy or lithology of principal constituents.

b. Size: Prevailing size if fairly uniform; range in sizes if not; proportions of different sizes as determined by sieving where feasible; distribution of sizes with relation to other features; vertical and lateral variations in size.

c. Shape: Crystalline (automorphic), angular, subangular, subrounded, rounded; relation of shape to size, material, position in beds, etc. For quantitative results on pebbles, etc., estimate or measure radius of curvature of sharpest edge, mean radius, and maximum and minimum diameter.

d. Character of surface: Glossy, smooth, mat pitted, chatter marked, etc.

e. Orientation: If not equidimensional, direction of greater dimensions with respect to bedding, to each other, etc.

f. Chemical and internal physical condition: Fresh, weathered decomposed, cracked, etc.

g. packing: Closeness and manner.

h. Pore space.

i. Cement: Present or absent: proportion; composition; variations in composition vertically and laterally and in relation to other characters; disposition with respect to bedding, fractures, etc.

j. Color: Wet or dry; location, inherent or as a stain in constituents or cement; variations and their relation to other factors, as composition, porosity, bedding, fracturing, fossils.

2. Organic constituents.

a. Kinds.

b. Size: Does the distribution of sizes show effects of mechanical deposition?

c. Condition: Entire, fragmented, partly dissolved, etc. Relation to kinds.

d. Distribution: With respect to character of beds, kinds of organisms, bedding, evidence of burrowing, etc.

E. Concretions

1. Form, size, color, composition, and their variations.

2. Internal structure; central nucleus organic or inorganic, central hollow; homogeneous; banded horizontally, concentrically, etc.; radial; compact; vesicular.

3. Boundary against country rock; Sharp, transitional with or without change in character.

4. Relation of bedding to concretions: Continuous through concretions; deflected above, below, or both; thinned above, below, etc.

5. Distribution: Random; regular; if regular, intervals between groups (layers), vertically and horizontally; differences between characters of concretions in different groups (layers). Relation of distribution to other characters, as mechanical, chemical, or organic composition of country rock; jointing, fissuring, folding, etc., of country rock; topography; groundwater level; etc.

CHART TO ILLUSTRATE THE DESCRIPTION OF WELL CUTTINGS

Kind of rock	Prominent modifying characteristics	Color	Size of		Minor characteristics	Additional
Sandstone	argillaceous calcareous dolomitic cherty carbonaceous bituminous glauconitic	color	1/16mm. 1/8 mm. 1/4 mm. 1/2 mm. 1 mm. 2 mm.	very fine fine medium coarse very coarse	rounding (& frosting): round, subround, subangular, angular secondary crystals porosity - cementation incoherent, friable, compact prominent grains: mica feldspar secondary minerals	lamination geodes, druses concretions weathering caved material personal opinion
Siltstone Shale	sandy calcareous carbonaceous bituminous dolomitic glauconitic	color			firmness tough brittle weak plasticity prominent grains mica secondary minerals	lamination concretions caved material personal opinion
Limestone Dolomite	argillaceous silty sandy cherty siliceous bituminous colitic glauconitic	color	dense grain very finely- finely- medium- coarsely very coarsely- crystalline granular		porosity compact porous vesicular fossils secondary minerals	lamination geodes, druses concretions weathering caved material personal opinion

Map or Book	Prominent Modifying Characteristics	Size of	Color	Structure	Specific Occurrence	Additional Minor Characteristics
Bedrock	irregular contorted dolomitic	very fine fine medium coarse very coarse	color	thin-bedded massive vesicular cross-bedded laminated	sandy calcareous dolomitic siliceous	limestone (& fossils), dolomite, sandstone, shale, conglomerate, breccia, gypsum, salt, coal, iron ore, clay, sand, gravel, peat, marl
Boulders	rounded angular subangular striated faceted	1/16 mm. 1/8 mm. 1/4 mm. 1/2 mm. 1 mm. 5 mm. 10 mm.	color		granitic basaltic quartzitic limestone sandstone shale conglomerate	
Clay	plastic sticky cohesive calcareous dolomitic		color			
Gravel	rounded subangular angular striated faceted		color		granitic basaltic quartzitic limestone sandstone shale conglomerate	
Sand	rounded subangular angular frosted polished		color		granitic basaltic quartzitic limestone sandstone shale conglomerate	
Silt	plastic nonplastic cohesive calcareous dolomitic		color			
Topsoil	humus loam clay loam sandy loam silt loam peat marl		color			

Glacial Deposits

Bedrock

Secondary minerals

Limestone
Dolomite
Sandstone
Shale
Conglomerate
Breccia
Gypsum
Salt
Coal
Iron ore
Clay
Sand
Gravel
Peat
Marl

Topsoil

Limestone
Dolomite
Sandstone
Shale
Conglomerate
Breccia
Gypsum
Salt
Coal
Iron ore
Clay
Sand
Gravel
Peat
Marl

Color

Size of

Structure

Specific Occurrence

Additional Minor Characteristics

Prominent Modifying Characteristics

Map or Book

CHART TO ILLUSTRATE SOME OF THE CHARACTERISTICS OF THE COMMON ROCKS AND SOILS

S57
W62
v.13 M795

NOMOGRAPH
FOR
CALCULATING MINERAL—MATTER—FREE COAL ANALYSES BASED ON PARR FORMULAS

Designed by A.J.W. Headlee — Drawn by Charles E. Hare
West Virginia Geological Survey — Paul H. Price, State Geologist
Morgantown W. Va. 1939

To illustrate the use of the Nomograph, the FC and Btu on the "dry" Mm-free basis is calculated for a coal having 2.0% moisture, 22.7% volatile matter, 67.3% fixed carbon, 7.8% ash, 0.9% sulfur, and 14,390 Btu.

A pin is placed on the 7.8% line of the ash scale, then the 0.9% line of the sulfur scale is placed opposite the pin. Holding the scale firmly and in a vertical position with the ash scale, the pin is moved to the 2.0% moisture line, it now being at the 10.11 point on the ash scale; this being a common denominator in the Parr formulas for "dry" Mm-free VM, FC and Btu. The point 67.5 on the base scale being located with a pin, the sulfur correction for the fixed carbon is made by moving the pin one space to the right for each 1.3% sulfur. Since the sulfur content is 0.9, the pin is moved slightly more than half a block to the right. This point (67.36) is projected vertically until it meets the denominator point (10.11) projected horizontally. This point of coincidence is then projected along the oblique lines to the base line, from which the value of 78.6 is read for the dry Mm-free fixed carbon. The point 14,390 Btu is located with a pin on the base line, the pin being moved one space to the right for each percent sulfur; each tenth of a percent being equivalent to a tenth of a scale division. Thus the 0.9% sulfur is corrected for by moving the pin 0.9 of a scale division to the right. This point (14,345) is projected vertically until it coincides with the denominator point projected horizontally, the point of coincidence being projected along the oblique lines to the base, where the value 16,100 is read as the dry, Mm-free Btu.

The Nomograph may be used to determine the "dry" or "moist" Mm-free volatile matter, fixed carbon, or Btu from an analysis on the "moist" or "dry" basis giving the moisture, volatile matter, fixed carbon, ash, sulfur, and Btu.

A more detailed discussion of the Nomograph may be found in Volume XIII, West Virginia Geological Survey.

Parr formulas:

Dry, Mm-free FC $= \frac{FC - 0.15\,S}{100 - (M + 1.08A + 0.55S)} \times 100$

Dry Mm-free VM $= \frac{VM - (0.08A + 0.4S)}{100 - (M + 1.08A + 0.55S)} \times 100$

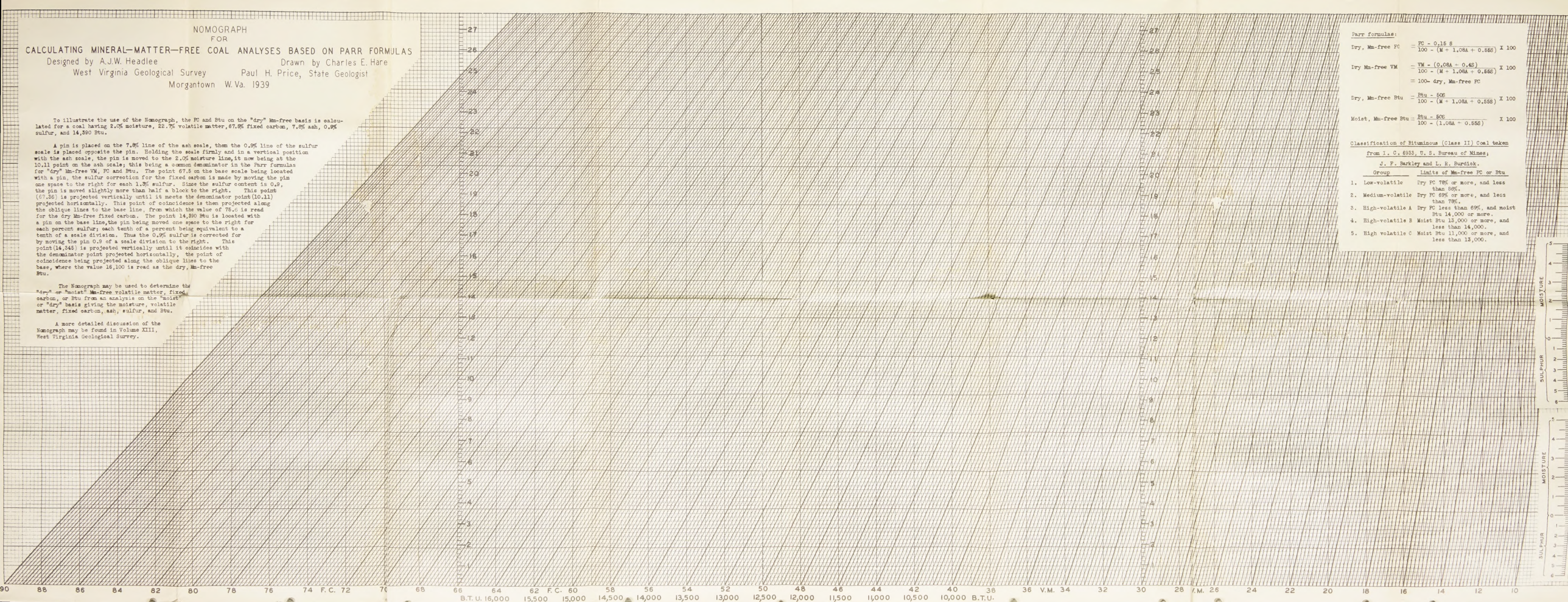
$= 100 -$ dry, Mm-free FC

Dry, Mm-free Btu $= \frac{Btu - 50S}{100 - (M + 1.08A + 0.55S)} \times 100$

Moist, Mm-free Btu $= \frac{Btu - 50S}{100 - (1.08A + 0.55S)} \times 100$

Classification of Bituminous (Class II) Coal taken from I. C. 6933, U. S. Bureau of Mines; J. F. Barkley and L. R. Burdick.

Group	Limits of Mm-free FC or Btu
1. Low-volatile	Dry FC 78% or more, and less than 86%.
2. Medium-volatile	Dry FC 69% or more, and less than 78%.
3. High-volatile A	Dry FC less than 69%, and moist Btu 14,000 or more.
4. High-volatile B	Moist Btu 13,000 or more, and less than 14,000.
5. High volatile C	Moist Btu 11,000 or more, and less than 13,000.



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LEGEND:—

Five Minute Sections: Per cent Fixed Carbon

- ------ 52.5–57.5
- ------ 57.5–62.5
- ------ 62.5–67.5
- ------ 67.5–72.5
- ------ 72.5–77.5
- ------ 77.5–82.5
- ------ 82.5–87.5
- ------ 87.5–

60 ~~~~ 60 Isocarb Lines

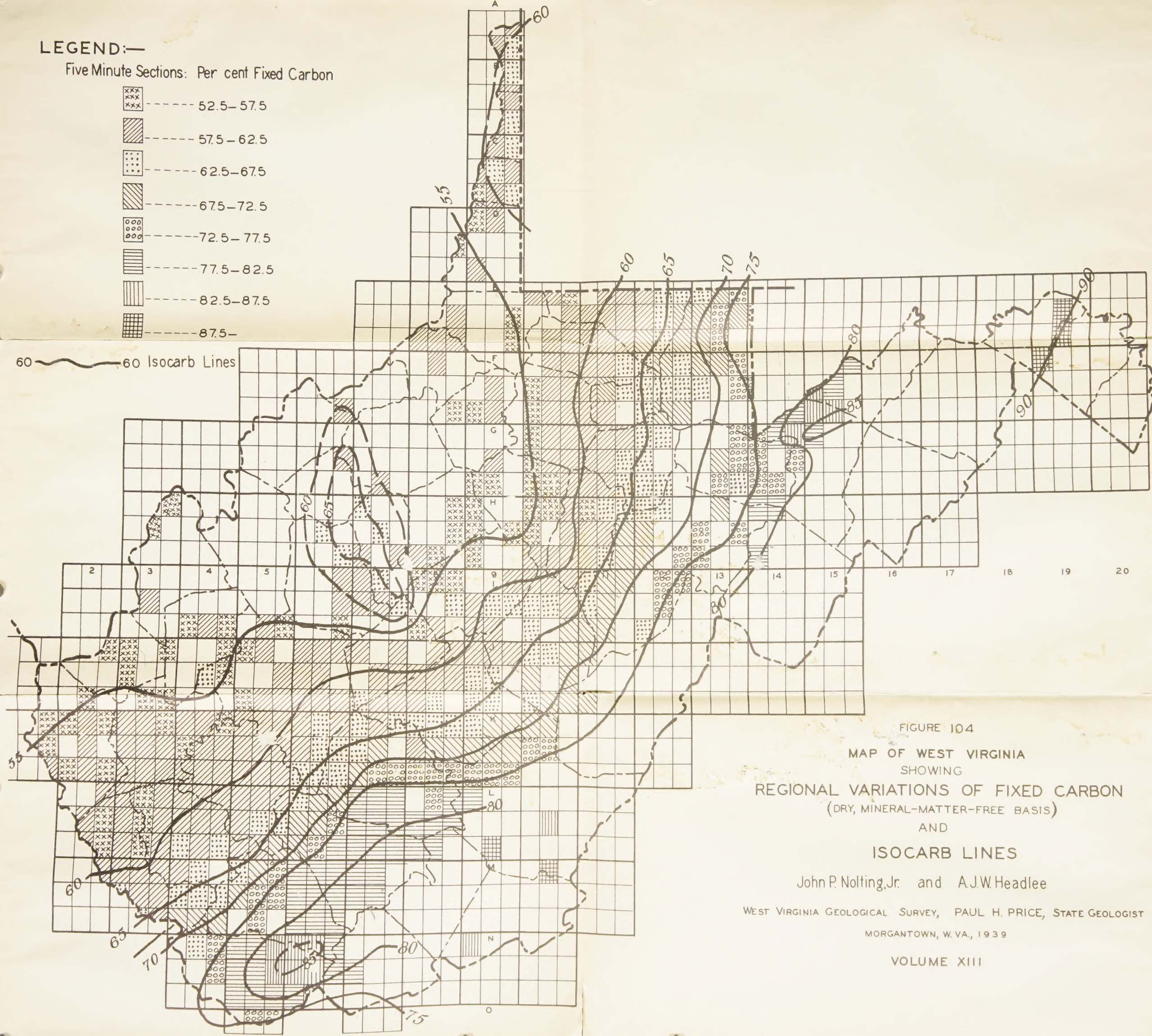

FIGURE 104

MAP OF WEST VIRGINIA

SHOWING

REGIONAL VARIATIONS OF FIXED CARBON

(DRY, MINERAL-MATTER-FREE BASIS)

AND

ISOCARB LINES

John P. Nolting, Jr. and A. J. W. Headlee

WEST VIRGINIA GEOLOGICAL SURVEY, PAUL H. PRICE, STATE GEOLOGIST

MORGANTOWN, W. VA., 1939

VOLUME XIII

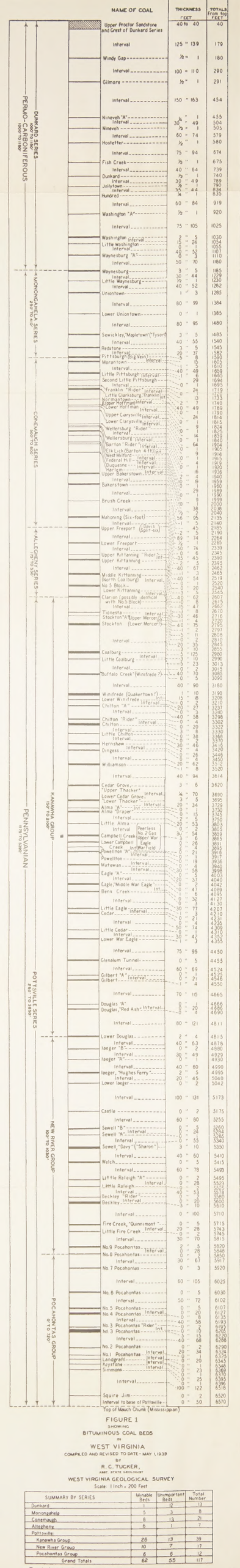
NAME OF COAL
THICKNESS FEET
TOTALS from Top FEET
PERMO-CARBONIFEROUS
DUNKARD SERIES 600FT to 1100FT 1000 TO 1100
MONONGAHELA SERIES 250 TO 410'
CONEMAUGH SERIES 500 TO 800'
ALLEGHENY SERIES 175 TO 1350'
PENNSYLVANIAN
KANAWHA GROUP 150' TO 2300'
POTTSVILLE SERIES 250' TO 2850'
NEW RIVER GROUP 300 TO 1080'
POCAHONTAS GROUP 0' TO 1120'
Upper Proctor Sandstone and Crest of Dunkard Series
Interval 125 " 139 179
Windy Gap ½ " 1 180
Interval 100 " 110 290
Gilmore ½" 1 291
Interval 150 " 163 454
Nineveh "A" ½ " 1 455
Interval 30 " 49 504
Nineveh ½ " 1 505
Interval 60 " 74 579
Hostetter ½" 1 580
Interval 75 " 94 674
Fish Creek ½ " 1 675
Interval 40 " 64 739
Dunkard ½ " 1 740
Interval 30 " 49 789
Jollytown ½ " 1 790
Interval 35 " 44 834
Hundred ¼ " 1 835
Interval 60 " 84 919
Washington "A" ½ " 1 920
Interval 75 " 105 1025
Washington Interval 2 " 5 1030
Little Washington Interval 15 " 24 1054
Interval 0 " 1 1055
Waynesburg "A" Interval 40 " 52 1107
Interval 3 " 3 1110
Waynesburg Interval 50 " 70 1180
Waynesburg Interval 3 " 5 1185
Little Waynesburg Interval 30 " 44 1229
Interval 33 " 44 1230
Uniontown Interval 40 " 52 1282
Interval 1 " 3 1285
Lower Uniontown Interval 80 " 99 1384
Interval 0 " 1 1385
Sewickley, "Mapletown" (Tyson) Interval 80 " 95 1480
Redstone Interval 3 " 5 1485
Pittsburgh (Big Vein) Interval 40 " 55 1540
Morantown Interval 3 " 5 1545
Interval 20 " 37 1582
Little Pittsburgh Interval 5 " 8 1590
Second Little Pittsburgh Interval 0 " 5 1605
Interval 29 " 29 1610
Franklin "Rider" Interval 40 " 49 1659
Little Clarksburg, Franklin Int. 0 " 1 1660
Normantown Interval 1 " 6 1666
Upper Hoffman Interval 0 " 24 1690
Lower Hoffman Interval 4.2 " 13 1703.2
Upper Claysville Interval 40 " 49 1752
Lower Claysville Interval 0 " 1 1753
Wellersburg "Rider" Interval 24 " 24 1777
Wellersburg Interval 0 " 1 1778
Barton "Rider" Interval 14 " 14 1792
Elk Lick (Barton 4th Bed) Interval 0 " 1 1793
West Milford Interval 64 " 64 1857
Peterial Hill Interval 0 " 1 1858
Duquesne Interval 4 " 9 1862
Harlem Interval 0 " 1 1863
Upper Bakerstown Interval 16 " 16 1879
Interval 2 " 4 1883
Bakerstown 0 " 1 1884
Interval 0 " 19 1903
Brush Creek 29 " 29 1932
Interval 0 " 9 1941
Mahoning (Six-foot) 10 " 10 1951
Interval 38 " 38 1989
Upper Freeport (Upper (Split-six)) 56 " 95 2045
Interval 1 " 5 2050
Lower Freeport (Lower (Split-six)) 2 " 5 2055
Interval 45 " 45 2100
Upper Kittanning "Rider" Int. 2 " 5 2105
Interval 89 " 74 2179
Lower Freeport 74 " 1 2180
Interval 50 " 74 2254
Upper Kittanning "Rider" Int. 0 " 1 2255
Upper Kittanning 33 " 45 2300
Interval 2 " 5 2305
Interval 40 " 67 2372
Middle Kittanning 0 " 1 2373
(North Castle) Interval 40 " 54 2427
No. 5 Block 0 " 1 2428
Lower Kittanning Interval 3 " 5 2433
Clarion (possibly identical with No. 5 Block) 40 " 62 2495
Interval 0 " 8 2503
Interval 15 " 47 2550
Tionesta Interval 3 " 8 2558
Stockton "A" (Upper Mercer) 30 " 46 2604
Stockton (Lower Mercer?) 4.0 " 7.5 2679.5
Interval 5 " 11 2690.5
Interval 20 " 35 2725.5
Coalburg Interval 5 " 10 2735.5
Little Coalburg 5 " 23 2758.5
Interval 0 " 2 2760.5
Buffalo Creek (Winnifrede?) 4.0 " 7.0 2767.5
Interval 40 " 90 2857.5
Winnifrede (Quakertown?) Interval 15 " 18 2875.5
Lower Winnifrede Interval 20 " 27 2902.5
Chilton "A" Interval 40 " 58 2960.5
Chilton "Rider" Interval 0 " 4 2964.5
Interval 20 " 29 2993.5
Little Chilton Interval 3 " 8 3001.5
Interval 0 " 38 3039.5
Herndean Interval 30 " 46 3085.5
Dingess Interval 0 " 4 3089.5
Interval 0 " 26 3115.5
Williamson Interval 20 " 62 3177.5
Interval 40 " 94 3271.5
Cedar Grove, "Upper Thacker" Interval ¾ " 70 3341.5
Lower Cedar Grove, Lower Thacker Interval 3 " 5 3346.5
Alma "A" Interval 20 " 34 3380.5
Alma "Draper" Interval 0 " 15 3395.5
Little Alma Interval 20 " 53 3448.5
Campbell Creek (Peerless No. 2 Gas Upper War Eagle Interval 30 " 54 3502.5
Lower Campbell Creek Int. Eagle Interval 0 " 6 3508.5
Powellton "A" Interval 0 " 19 3527.5
Powellton Interval 0 " 4 3531.5
Matewan Interval 30 " 58 3589.5
Eagle "A" Interval 0 " 5 3594.5
Eagle, "Middle War Eagle" Interval 20 " 37 3631.5
Bens Creek Interval 0 " 2 3633.5
Interval 40 " 94 3727.5
Lower Cedar Grove, "Upper Thacker" Interval ¾ " 70 3797.5
Alma "A" Interval 3 " 5 3802.5
Alma "Draper" Interval 20 " 34 3836.5
Little Alma Interval 0 " 15 3851.5
Campbell Creek (Peerless No. 2 Gas Upper War Eagle Interval 20 " 53 3904.5
Lower Campbell Creek Int. Eagle Interval 30 " 54 3958.5
Powellton "A" Interval 0 " 6 3964.5
Powellton Interval 0 " 19 3983.5
Matewan Interval 0 " 4 3987.5
Eagle "A" Interval 30 " 58 4045.5
Eagle, "Middle War Eagle" Interval 0 " 5 4050.5
Bens Creek Interval 20 " 37 4087.5
Interval 0 " 2 4089.5
Glenalum Tunnel 0 " 6 4095.5
Interval 0 " 32 4127.5
Little Eagle Interval 30 " 73 4200.5
Cedar Interval 0 " 3 4203.5
Interval 0 " 27.1 4230.6
Little Cedar Interval 50 " 74 4304.6
Lower War Eagle Interval 3.0 " 4.2 4308.8
Interval 1 " 3 4311.8
Interval 75 " 95 4406.8
Glenalum Tunnel 0 " 5 4411.8
Interval 60 " 69 4480.8
Gilbert "A" Interval 0 " 21 4501.8
Gilbert 1 " 4 4505.8
Interval 70 " 115 4620.8
Douglas "A" 0 " 1 4621.8
Douglas, "Red Ash" Interval 0 " 20 4641.8
0 " 8 4649.8
Interval 80 " 121 4770.8
Lower Douglas 2 " 4 4774.8
Interval 40 " 63 4837.8
Jaeger "B" 0 " 2 4839.8
Interval 30 " 49 4888.8
Jaeger "A" 0 " 3 4891.8
Interval 40 " 60 4951.8
Jaeger, "Hughes Ferry" 2 " 5 4956.8
Interval 20 " 45 5001.8
Lower Jaeger 0 " 2 5003.8
Interval 100 " 131 5134.8
Castle 0 " 2 5136.8
Interval 60 " 80 5216.8
Sewell "B" 0 " 5 5221.8
Sewell "A" Interval 0 " 24 5245.8
Interval 0 " 55 5300.8
Sewell, "Davy" ("Sharon") 3 " 10 5310.8
Interval 40 " 60 5370.8
Welch 0 " 5 5375.8
Interval 60 " 78 5453.8
Little Raleigh "A" 0 " 2 5455.8
Little Raleigh Interval 0 " 28 5483.8
Interval 40 " 53 5536.8
Beckley "Rider" Interval 0 " 20 5556.8
Beckley 3 " 10 5566.8
Interval 0 " 100 5666.8
Fire Creek, "Quinnimont" 0 " 5 5671.8
Little Fire Creek Interval 20 " 28 5699.8
0 " 2 5701.8
Interval 30 " 70 5771.8
No. 9 Pocahontas Interval 2 " 5 5776.8
No. 8 Pocahontas Interval 0 " 28 5804.8
Interval 30 " 67 5871.8
No. 7 Pocahontas 0 " 3 5874.8
Interval 60 " 105 5979.8
No. 6 Pocahontas 0 " 5 5984.8
Interval 50 " 72 6056.8
No. 5 Pocahontas 0 " 5 6061.8
No. 4 Pocahontas Interval 0 " 20 6081.8
Interval 0 " 5 6086.8
Interval 40 " 58 6144.8
No. 3 Pocahontas "Rider" Int. 0 " 5 6149.8
No. 3 Pocahontas 0 " 15 6164.8
Interval 0 " 13 6177.8
Interval 40 " 68 6245.8
No. 2 Pocahontas 0 " 2 6247.8
No. 1 Pocahontas Interval 20 " 34 6281.8
Lanark Interval 0 " 1 6282.8
Keystone Interval 0 " 20 6302.8
Simmons Interval 0 " 3 6305.8
Interval 0 " 23 6328.8
Interval 0 " 25 6353.8
Interval 100 " 122 6475.8
Squire Jim 0 " 2 6477.8
Interval above top of Pottsville 0 " 50 6527.8
Top of Mauch Chunk (Mississippian) 6570

FIGURE 1
SHOWING
BITUMINOUS COAL BEDS
IN
WEST VIRGINIA
COMPILED AND REVISED TO DATE - MAY 1, 1939
BY
R. C. TUCKER,
ASST. STATE GEOLOGIST
WEST VIRGINIA GEOLOGICAL SURVEY
Scale: 1 Inch = 200 Feet

SUMMARY BY SERIES	Minable Beds	Unimportant Beds	Total Number
Dunkard	1	12	13
Monongahela	5	3	8
Conemaugh	8	13	21
Allegheny	6	1	7
Pottsville			
Kanawha Group	26	13	39
New River Group	10	7	17
Pocahontas Group	6	6	12
Grand Totals	62	55	117

* Divided into Peerless and No. 2 Gas.

PEL